

SECTION 02577
PAVEMENT MARKING

PART 1 - GENERAL

0.1 DESCRIPTION OF WORK

- A. Work Included: This Section specifies the furnishing and application of reflectorized pavement markings.
- B. All work shall be in accordance with the Commonwealth of Massachusetts, Highway Department (MHD) Standard Specification for Highways and Bridges.

0.2 SUBMITTALS

- A. Submit a schedule of pavement marking operations to the Engineer, for approval, not less than seven days prior to the proposed date of application of any pavement marking.

PART 2 - PRODUCTS

0.1 MATERIALS

- A. Thermoplastic Striping: Comply with MHD requirements. Pavement striping material shall be applied to the pavement in a molten state by mechanical means with a surface application of glass spheres.
 - 1. White Color: Composition by weight:
 - Binder: 22 percent minimum.
 - Glass Beads: 30-40 percent.
 - Titanium Dioxide: 10 percent minimum.
 - Calcium Carbonate and Filler: 38 percent maximum.
 - 2. Yellow Color: Composition by weight:
 - Binder: 22 percent minimum.
 - Glass Beads: 30-40 percent.
 - Titanium Dioxide: 10 percent minimum.
 - Yellow Pigment, Calcium Carbonate and Filler: To be determined by manufacturer.
 - 3. Glass Beads: Beads shall be transparent, clean, colorless glass, smooth and properly shaped, and contain no pits or bubbles, and meeting the following gradation:

Sieve	Percent Passing
No. 20	100
No. 30	75 - 95
No. 50	15 - 35
No. 80	0 - 5

- a. When tested by the liquid immersion method, the beads shall have a minimum refraction of 1.50.

B. Acrylic Striping: Comply with MHD requirements. Pavement striping material shall be an acrylic type, low VOC, water based paint.

1. White Color: Composition by weight:

Pigment:	58 percent minimum.
Total Solids:	76 percent minimum.
Titanium Dioxide:	1 pound/gallon minimum.
2. Yellow Color: Composition by weight:

Pigment:	56 percent minimum.
Total Solids:	75 percent minimum.
Titanium Dioxide:	0.3 pounds/gallon minimum.

PART 3 - EXECUTION

0.1 EQUIPMENT

- A. Use standard commercial-quality equipment of the type normally required for application of pavement markings. Operate the equipment in accordance with the manufacturers' instructions. Truck-mounted equipment is approved for the application of pavement marking except where in the Engineer's judgment travel will be unreasonably delayed or the quality of the work performed by the equipment is unsatisfactory.

0.2 LAYOUT OF WORK

- A. The Engineer will provide at a convenient location on the roadway a line of reference for use by the Contractor in establishing the location of markings. This line of reference will be at a maximum of 50-foot intervals by means deemed satisfactory by the Engineer. Follow this line of reference without deviation. Reapply any line deviating from the establishing control or of incorrect width, as directed by the Engineer.

0.3 APPLICATION OF MARKINGS

- A. Apply pavement markings as follows:

MATERIAL	MATERIAL APPLICATION TEMPERATURE DEGREES F	LINE THICKNES S MILS	REFLECTORIZED BEAD APPLICATION
M7.01.08	180-195	15	6 LBS/GAL
M7.01.09	180-195	15	6 LBS/GAL
M7.01.10	40-120	15	6 LBS/GAL
M7.01.11	40-120	15	6 LBS/GAL
M7.01.03	400-425	6-188	1 LB/20 SF DROP ON
M7.01.04	400-425	5-188	1 LB/20 SF DROP ON

- B.** Use no thinners for the above-listed pavement marking applications except in accordance with the manufacturer's specifications and at the direction of the Engineer.
- C.** Heat no paint or pavement marking material above the temperature marked on the container.
- D.** Apply markings only in seasonable weather and in accordance with good painting practices. The surface shall be dry and free of sand, grease, oil or other foreign substances prior to the application. Prepare the surface to accept the application as part of the work of this section, with no additional compensation. The Engineer will make the final determination for all of the foregoing.
- E.** Bituminous concrete pavements shall have been in place for 48 hours prior to the application of pavement markings. When it is necessary to expedite the flow of traffic, the Engineer may reduce the waiting period as is deemed necessary.
- F.** The ambient (air) temperature for thermoplastic application is to be a minimum of 45 Degrees F and rising at the time of marking operations. If work has started and air temperatures fall below 45 Degrees F and continuous cooling is indicated, work shall be stopped. In cool weather conditions, temporary drops down to 40 Degrees F will be tolerated providing temperatures also vary upwards. Sustained striping (greater than one hour) at 40 Degrees F shall not be allowed. Starting work at air temperatures lower than 45 Degrees F shall not be allowed. Contractor shall remove and replace thermoplastic applications below 40 Degrees F at no expense to the Authority.
- G.** If for any reason material is spilled or tracked on the highway, or any markings applied by the Contractor, in the Engineer's judgment, are of incorrect width or pattern or fail to conform to the established line of

reference, remove such material by a method that is not injurious to the roadway surface and is acceptable to the Engineer, clean the roadway surface, prepare the surface for a reapplication of markings, and reapply the markings as directed without additional compensation for any of the foregoing corrective operations.

0.4 PROTECTION OF MARKINGS

- A.** Protect markings until sufficiently dry to bear traffic on highways that are open to traffic. Protect markings by traffic cones not less than 18 inches in height except in the case of markings which cure to a no-track condition in 180 seconds or less. In the latter case, protection may be provided by a convoy of vehicles with suitable warning devices to warn overtaking or on-coming traffic that the pavement marking operation is in progress.
- B.** Broken Lines. On tangents and on curves of 1000 foot radius or greater place at least one cone on every other bar. On curves of less than 1000 foot radius place one cone on every bar unless otherwise directed by the Engineer.
- C.** Solid Lines. On tangents and on curves of 1000 foot radius or greater space cones not over 50 feet apart and on curves of less than 1000 foot radius space cones not over 50 feet unless otherwise directed by the Engineer. On edge lines adjacent to the median, wider spacing may be used as directed by the Engineer. In order to control the proper positioning of the cones during the drying period, assign sufficient personnel as determined by the Engineer. Such control is dependent on traffic density, cone widths, and the like.

PART 4 - MEASUREMENT AND PAYMENT

0.1 MEASUREMENT

- A.** Pavement marking will be measured by the linear foot of each type of line, and by the square foot for each type of arrow and other non-linear marking. The length of broken lines will be obtained by using 3/8 of the equivalent measure for solid lines.

0.2 PAYMENT

- A.** Payment marking will be paid at the Contract unit prices for the quantities determined as specified above.

0.3 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
1040.901	PAVEMENT MARKINGS	LF
1040.912	PAVEMENT ARROWS	SF

END OF SECTION

NOTES TO THE DESIGNER

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:

1. None